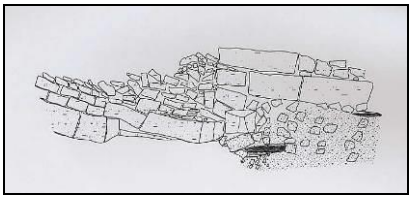
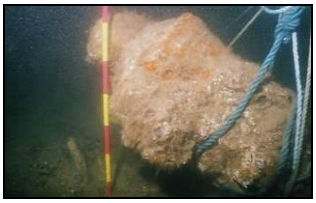
Appendix A16.11 Intertidal Archaeological Survey Undertaken as Part of the Environmental Impact Assessment

GREATER DUBLIN DRAINAGE SCHEME
INTERTIDAL INSPECTION
VELVET STRAND, BURROW, CO. DUBLIN
15D0019, 15R0025

THE ARCHAEOLOGICAL DIVING COMPANY LTD.

GREATER DUBLIN DRAINAGE SCHEME
INTERTIDAL INSPECTION
VELVET STRAND, BURROW, CO. DUBLIN
15D0019, 15R0025

06 October 2015

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THE ARCHAEOLOGICAL DIVING COMPANY LTD.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ADCO	The Archaeological Diving Company Ltd
DAHG	Department of Arts, Heritage and the Gaeltacht
E	Easting
N	Northing
NGR	National Grid Reference
OPW	Office of Public Works
RMP	Record of Monuments and Places
RPS	Record of Protected Structures

EXECUTIVE SUMMARY

The Department of the Arts, Heritage and the Gaeltacht, submitted a request for further information in response to The Greater Dublin Drainage – Foreshore Licence Application- Ref No: FS006292. This submission included the specification that, "The archaeologist shall carry out an intertidal survey of the proposed intertidal investigation area at low spring tides prior to a foreshore license being granted. The intertidal survey shall be accompanied by a hand held metal detection survey. The intertidal and metal detection surveys shall be licensed to the Department of Arts, Heritage and Gaeltacht under the National Monuments Acts, 1930-2004."

The Archaeological Diving Company Ltd (ADCO) was appointed by Irish Archaeological Consultancy Ltd to undertake an archaeological intertidal inspection on Velvet Strand, Burrow townland, Co. Dublin, at the location of the single intertidal borehole, Borehole 1 (Irish National Grid 325179E 242319N) illustrated on the attached Figure 1.

The scope of the survey was extended to include the access route that will be used to facilitate access of machinery to the borehole location. The access route extends from a point close to the north end of Velvet Strand to a point *c*. 1.8km south, where access will run *c.* 100m eastwards from the base of the sand dunes to Borehole 1.

The archaeological survey area extended north and south of the access route, and from the base of the current sand dunes to the Low Water mark. Borehole 2, illustrated on Figure 2 was determined to be outside of the intertidal zone and was not included in the scope of the survey.

The archaeological inspection took place on 10 April 2015 at Low Water Spring Tide. In addition to the proposed development elements, the locations of several recorded shipwreck sites on the beach were inspected.

A number of features were recorded and noted. There was no indication of the recorded shipwreck sites, but the survey did identify a new timber shipwreck. The new site lies 80m directly east of Borehole 1. It consists of the exposed tips of five framing timbers, which form a bow-shaped feature that is aligned North-South. It is

centered at ING 325259E 242328N. The remains indicate the presence of a vessel beneath the covering sands whose base is probably intact.

The location of the new wreck lies directly between Boreholes 1 and 2, within the wayleave of the proposed outfall and is within the impact area of the outfall pipeline.

The outfall will be tunnelled to a point between Borehole 1 and 2, after which the outfall trench will be dredged. The actual end point of the tunnel and start of the dredging has yet to be decided.

Should the wrecksite be impacted on directly or indirectly, it will be necessary to excavate the remains in advance of such works commencing, and remove it from the development area.

It will be necessary to monitor all site investigations work and construction-phase works, to ensure that full record is taken of any archaeological material that may become exposed in the course of such works.

Further archaeological mitigations are also recommended, to facilitate a managed resolution.

Recommendations are subject to the approval of the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.

LIST OF FIGURES

LIST OF PLATES

1.0 INTRODUCTION

The Archaeological Diving Company Ltd (ADCO) was appointed by Irish Archaeological Consultancy Ltd to undertake an archaeological intertidal inspection on Velvet Strand, Burrow townland, Co. Dublin, where it is proposed to carry out site investigations work for the Greater Dublin Drainage marine outfall pipe.

Access to the beach for site investigation will be from a point close to the north end of Velvet Strand to a point *c.* 1.8km south, and from where access is to run *c.* 100m eastwards from the base of the sand dunes to Borehole 1, the location for site investigations.

The archaeological survey area extended north and south of the haul road, and from the base of the current sand dunes to the Low Water mark (Figure 1).

The archaeological inspection took place on 10 April 2015 at Low Water Spring Tide, under licence from the Department of Arts, Heritage and the Gaeltacht, 15D0019, 15R0025. In addition to the proposed development elements, the locations of several recorded shipwreck sites on the beach were inspected.

The current report presents the archaeological observations, and includes an impact assessment of the proposed development works and a set of mitigation proposals to ensure the proper recording and observation of archaeological material associated with the project.

2.0 THE PROPOSED DEVELOPMENT

A way-leave is to be established along the foreshore to gain access to the Borehole 1 location (Figure 2). The way-leave is to be 5m wide and will be fenced.

The borehole will be investigated using a land-based rig, and using Cable Percussive and Rotary Core testing. The borehole is to be located on the beach at ING 325179E 242319N.

3.0 THE RECEIVING ENVIRONMENT

The existing archaeological environment has been dealt with separately by ADCO, as part of an archaeological assessment of marine geophysical data acquired for the present project[1]. Velvet Strand is a place that has a significant number of shipwrecks (Table 1, Figure 3). The sites are recorded as being partially exposed at particular low waters. A combination of timber and metal remains exists, and the presence of copper bolts on one site indicates the potential for pre-19th century remains. There are nine separate entries but it is probable that three entries are duplications, representing a distinction between recorded locations on 19th-century Admiralty Charts and locations recorded by fieldwork in more recent times (ie sites W0030, W00541 and W00842 appear to be the same as sites W00857, W00859 and W00858 respectively). It is unusual to find such a concentration of shipwreck remains along such a relatively short extent of shoreline. One site (W00860) occurs *c*. 300m south of Borehole 1.

Reference	Location	ING E	ING N	Description	Proximity to development
W00830	Velvet Strand	326130	241153	Marked on Admiralty Chart 2831 (1866)	1.5km South of Borehole 1
W00841	Velvet Strand	325756	241498	Marked on Admiralty Chart 1415 (1869)	1,020m South of Borehole 1
W00842	Velvet Strand	326258	240911	Marked on Admiralty Chart 1415 (1869)	1.8m South of Borehole 1
W00856	Velvet Strand	324889	243269	Wooden wreck exposed in 2002-3 and occasionally when sand levels are low. Orientate E-W, consisting of c. 20 frames and some hull planking. Treenails, dowel holes, copper bolts.	63m East of access route
W00857	Velvet Strand	325898	241079	2 vertical timbers extend 35cm from seabed, attached by a metal plate and iron bolts, possibly forming part of a rudder.	1.4km South of Borehole 1
W00858	Velvet Strand	326193	240838	Timber and metal uprights exposed.	1.8km South of Borehole 1
W00859	Velvet Strand	325621	241501	Lower hull of wooden wreck, 7.8m long, 5.2m wide, oriented NNW-SSE, 20 oak frames exposed on W side of	950m South of Borehole 1

[1] Niall Brady, 'Marine archaeological assessment, Greater Dublin Drainage Project, Portmarnock Outfall', unpublished report of the Archaeological Diving Company Ltd, May 2014.

Reference	Location	ING E	ING N	Description	Proximity to development
				vessel, 7 on E side. Planking visible on both sides, attached by treenails.	
W00860	Velvet Strand	325428	242154	Timber wreck. No further details are available.	300m South of Borehole 1
W00861	Velvet Strand	324978	243585	Wooden wreck, sometimes exposed at LW. Curving line of 38 futtocks attached to hull planking. Two other lines of timber also run parallel.	190m East of access route

Table 1: Known Shipwreck Sites on Velvet Strand.

Source: Karl Brady, *Shipwreck Inventory of Ireland*, 2009.

4.0 INTERTIDAL INSPECTION

4.1 Survey Methodology

A visual non-disturbance inspection and metal-detection survey was carried out during daylight Low Water Springs on 10 April 2015. The report author walked from the north end of Velvet Strand southwards to an expanse of outcropping bedrock at ING 325898E 241079N. Equipped with a hand-held metal-detector, inspection progressed in East-West sweeps across the intertidal zone, with particular attention being paid to the recorded locations of wrecksites and to the location of Borehole 1. The inshore section where it is proposed to establish the haul road was inspected following completion of the Low Water inspections, and progressed from south to north. A Garmin eTrex™ hand-held GPS unit was used to record positioning, with accuracy good to 6m. The device was pre-programmed with the known locations of interest (shipwreck sites and Borehole 1 and 2), to ensure all accessible locations were inspected. A photographic log was maintained to support the written record.

The weather was calm. The area surveyed extended 50m north of the proposed access route, and 1.4km south of it, and extended east to the Low Water mark, some 150m east of Borehole 1.

4.2 Topography

Velvet Strand comprises a gently sloping long sandy beach, with minimal variation across the intertidal foreshore (Plate 1). It is overlooked by sand-dunes on its landward side, which give way to a developed beach front at the north end (Plate 2).

4.3 Natural features

The sand dune system that overlooks the beach area is in retreat. Figure 3 shows the line of the shoreline as recorded on the Third Edition Ordnance Survey maps, *c.* 1912, as well as the present-day shoreline (highlighted as a blue line). The extent of coastal retreat can therefore be plotted. The dune system is low-lying, and some attempt at coastal protection is evident, where a line of limestone boulder is inserted at the foot of the dunes today (Plate 3).

There is little variation in the sand topography across the beach or along its length. A gentle variation in sand height across its width gives rise to some element pooling at Low Water (Plate 4). These features no doubt reflect the dynamic nature of the sand movement along the beach that results from longshore drift.

Three areas of bedrock were observed on the beach. A linear exposure extends eastwards from the High Water Mark, close to the north end of the survey area (324724E 24409N) (Plate 5). A pad of concrete is evident on the landward end of the exposure. The location coincides with the alignment of a subsea cable inserted in 2011, and it is suggested that the outcrop may have been cut into to secure the cable landfall. The access route will be directed across this location.

A second exposure of bedrock lies to the south (325259E 242328N) (Plate 6). It comprises localized three exposures of rock that are aligned broadly ENE-WSW, and dip to the south. The alignments continue those evident on the headland that creates the north end of Velvet Strand. The exposures lie 80m east of the proposed access route and will not be impacted by any works.

The third exposure of rock lies to the south, where the beach widens noticeably. Rock itself is not entirely evident as there is a thick cover of concreted shell (325898E 241079N) (Plate 7). This location is 1.4km south of the proposed works and will not be impacted by the works.

4.4 Known shipwreck locations

The inspection visited the locations of six of the nine known shipwreck locations on Velvet Strand (Table 2). This included all of the locations that lie within proximity of

the proposed works, as well as several sites that lie some distance to the south. In no instance was any indication of wreckage identified.

In the case of site W00856, which lies approximately 63m east of the proposed access route, observations made in 2002-3 recorded 20 timber frames and some hull planking, and details that included the presence of treenails, dowel holes and copper bolts. There is nothing visible today (Plates 8-10). The lack of visibility of these features today is compounded by the absence of any detection of buried metal at the location. This might suggest that the charted coordinates are inaccurate; however, careful search of the wider area around the location also failed to identify any feature. The absence of visible remains at any of the other known wrecksite locations that were inspected, suggests instead that they are buried beneath the covering sands. This in turn suggests a very dynamic state of the sands that form the beach area; a point that is supported by the progress of coastal retreat which is evident when comparing the historic coastline with the present-day coastline.

Reference	Known Description	Proximity to development	Intertidal Observation	Impact Assessment
W00830	Marked on Admiralty Chart 2831 (1866)	1.5km South of Borehole 1	Did not inspect as the location was sub-tidal	None
W00841	Marked on Admiralty Chart 1415 (1869)	1,020m South of Borehole 1	There is no indication of wreckage in the location today, which is covered in sand. The location was determined to be *c.* 30m inshore of the LWM when inspected.	None
W00842	Marked on Admiralty Chart 1415 (1869)	1.8m South of Borehole 1	Did not inspect as the location lies too far to the south.	None
W00856	Wooden wreck exposed in 2002-3 and occasionally when sand levels are low. Orientate E-W, consisting of *c.* 20 frames and some hull planking. Treenails, dowel holes, copper bolts.	63m East of access route	There is no indication of wreckage in the location today, which is covered in sand. Located on the mid- to inner area of the intertidal zone.	None
W00857	2 vertical timbers extend 35cm from seabed, attached by a metal plate and iron bolts, possibly forming part of a rudder.	1.4km South of Borehole 1	There is no indication of wreckage in the location today, which is beside a wide exposure of bedrock-and-shell, and straddles the LWM.	None
W00858	Timber and metal uprights exposed.	1.8km South of Borehole 1	Did not inspect as the location lies too far to the south.	None
W00859	Lower hull of wooden	950m South	There is no indication	None

Reference	Known Description	Proximity to development	Intertidal Observation	Impact Assessment
	wreck, 7.8m long, 5.2m wide, oriented NNW-SSE, 20 oak frames exposed on W side of vessel, 7 on E side. Planking visible on both sides, attached by treenails.	of Borehole 1	of wreckage in the location today, which is covered in sand. The location was determined to be *c.* 130m inshore of the LWM when inspected.	
W00860	Timber wreck. No further details are available.	300m South of Borehole 1	There is no indication of wreckage in the location today, which is covered in sand. The location was determined to be immediately adjacent to the LWM when inspected.	None
W00861	Wooden wreck, sometimes exposed at LW. Curving line of 38 futtocks attached to hull planking. Two other lines of timber also run parallel.	190m East of access route	There is no indication of wreckage in the location today, which is covered in sand. The location was determined to be *c.* 20m inshore of the LWM when inspected.	None

Table 2: Intertidal observation and impact assessment at known Shipwreck Sites on Velvet Strand.

Source of known records: Karl Brady, *Shipwreck Inventory of Ireland*, 2009.

4.5 New shipwreck location, 325259E 242328N

The dynamic nature of the sands on Velvet Strand is emphasized further by the discovery of a new shipwreck location made during the intertidal inspection.

The new shipwreck is located at 325259E 242328N (ITM 725182E 742352N), placing it 7m north of a straight line between Boreholes 1 and 2, and 80m east of Borehole 1 (Figure 4, Plates 11-13). It is represented by a series of six framing timbers, whose eroded tips are exposed just above the covering sands. Five of the timbers form a bow-shaped plan that suggests the length of one side of the vessel and its orientation. The sixth timber is the only member suggesting the other long side of the vessel. The wreck is orientated North-South and the line of timbers represent the starboard side. The exposed timbers extend over an area that is 10m long, while the sixth timber ìs 3.2m away, and indicates the possible width of the vessel. It does not appear to be a large vessel, but it should be noted that the full extent of the vessel is buried. The exposure of the timbers along the starboard side may indicate that the vessel lies on its side, tilted towards land. There is no metal associated with the

timber and no indication of fastenings in the little that is exposed. Metal detection did not highlight the presence of ferrous metal in the underlying sands.

The fragmentary details of the new wrecksite do not compare closely with details of the known wrecksites on Velvet Strand, suggesting that it is indeed an entirely new and previously unrecorded wreck.

The location of the new wreck lies directly between Boreholes 1 and 2, and would be considered to be within the direct impact area of the outfall pipe should the borehole locations reflect the proposed centerline.

4.6 Borehole locations and access route

The location of Borehole 1 was inspected and no features of interest were observed.

The location of Borehole 2 was sub-tidal and was therefore not accessible for inspection.

The route of the proposed access route was inspected and no features of archaeological interest were observed (Plate 14).

5.0 IMPACT ASSESSMENT

The footprint for the access road will not impact on any known archaeological sites.

Borehole 1 is positioned in a location that has no known archaeological material. However, it lies close to two features of archaeological interest; the site of Wreck 00860 is 300m to the south, while the site of the new wrecksite is 80m to the east. The location of the new wrecksite lies directly between Boreholes 1 and 2, and is within the direct impact area of the outfall pipe. The outfall will be tunneled to a point between Borehole 1 and Borehole 2, after which the outfall trench will be dredged. The actual end point of the tunnel and the start of the dredging has yet to be decided..

Should the wrecksite be impacted on directly or indirectly, it will be necessary to excavate the remains in advance of such works commencing, and remove it from the development area.

7.0 MITIGATION PROPOSALS

7.1 Project Specific Measures

AVOIDANCE. It is recommended that the site of the new wreck is avoided during site investigations and construction.

EXCAVATION. If avoidance is not possible, it will be necessary to excavate fully the new wrecksite prior to the construction of the outfall, to preserve the site by record. Excavation would be carried out as an intertidal exercise and would be done by a specialist team of maritime archaeologists.

MONITORING. Ground disturbance activities associated with site investigations works and construction phase works will be archaeologically monitored under licence from the DAHG, with the proviso to resolve fully any archaeological material that occurs during such works. . As part of the scope of the Marine GI contractors works, the requirement for on board archaeological monitoring of all boreholes and grab sampling has been included. This will be conducted under license.

7.2 Project Management Measures

All archaeological site work will be licensed by the Department of Arts, Heritage and Gaeltacht. Licence applications (Detection Device, Dive Survey, and Excavation) take a minimum of three working weeks to be processed, and sufficient lead time is required to ensure that such permits are in place before construction works commence.

THE TIME SCALE for the pre-construction and construction phases should be made available to the archaeologist, with information on where and when the various elements and ground disturbances and dredging will take place.

SUFFICIENT NOTICE. It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the pre-construction and construction works commencing. This will allow for prompt arrival on site to undertake additional surveys and to monitor ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.

DISCOVERY OF ARCHAEOLOGICAL MATERIAL. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that any machine work cease in the immediate area to allow the archaeologist/s to inspect any such material.

ARCHAEOLOGICAL MATERIAL. Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between the client and the licensing authorities.

ARCHAEOLOGICAL TEAM. It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation. Excavation work of marine sites must be done by archaeologists specialized in Marine and Underwater Archaeology.

SECURE SITE OFFICES and facilities should be provided on or near those sites where excavation is required.

SECURE WET AND DRY STORAGE for artefacts recovered during the course of the monitoring and related work should be provided on or near those sites where excavation is required.

BUOYING of any such areas would be necessary once discovered and during excavation.

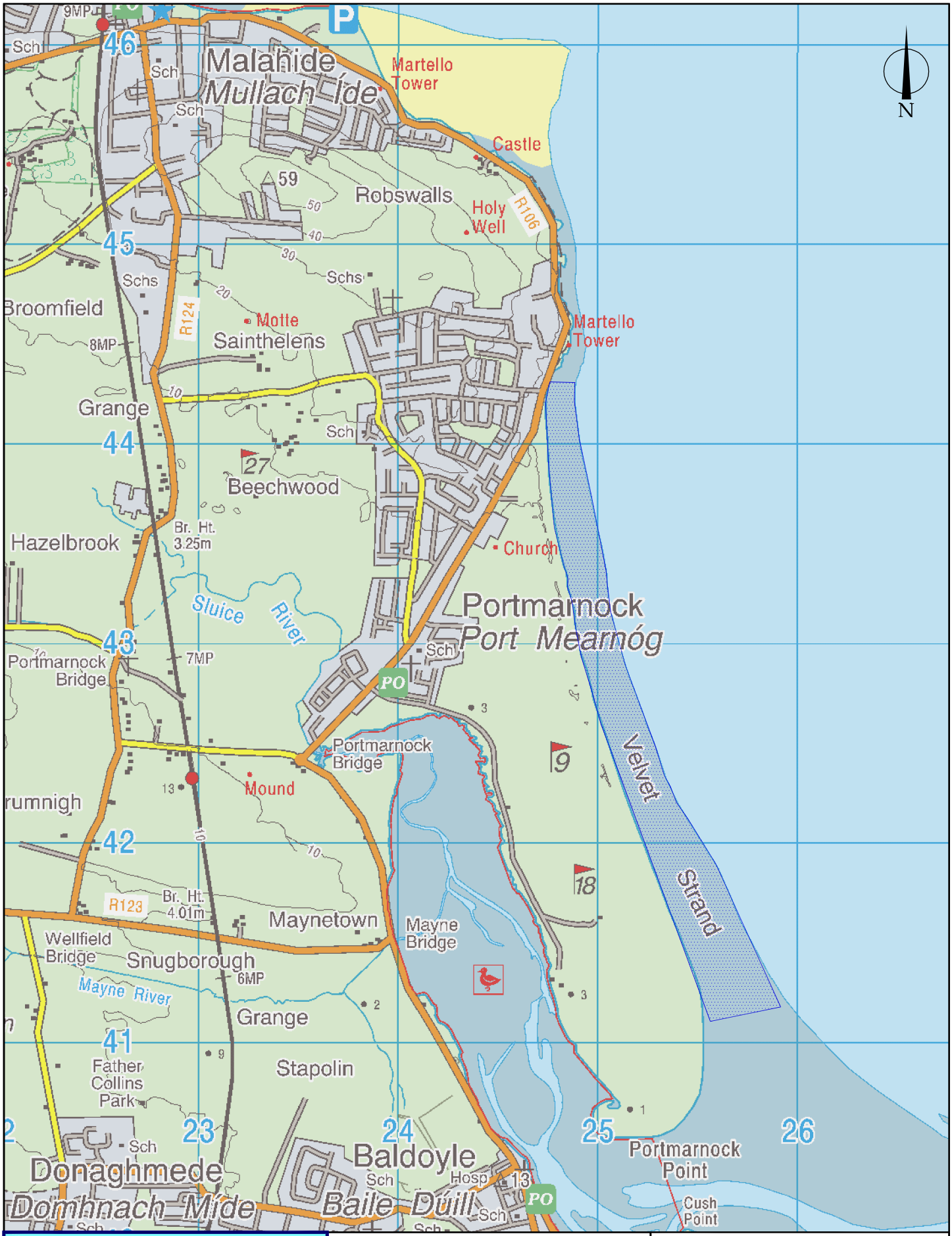
ADEQUATE FUNDS to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

MACHINERY TRAFFIC during construction must be restricted as to avoid any of the selected sites and their environs.

SPOIL should not be dumped on any of the selected sites or their environs.

PLEASE NOTE: All of the above observations and conclusions are based on the archaeological information and information supplied for the GDD scheme. Should any alteration occur, further assessment would be required.

PLEASE NOTE: Recommendations are subject to approval by the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.



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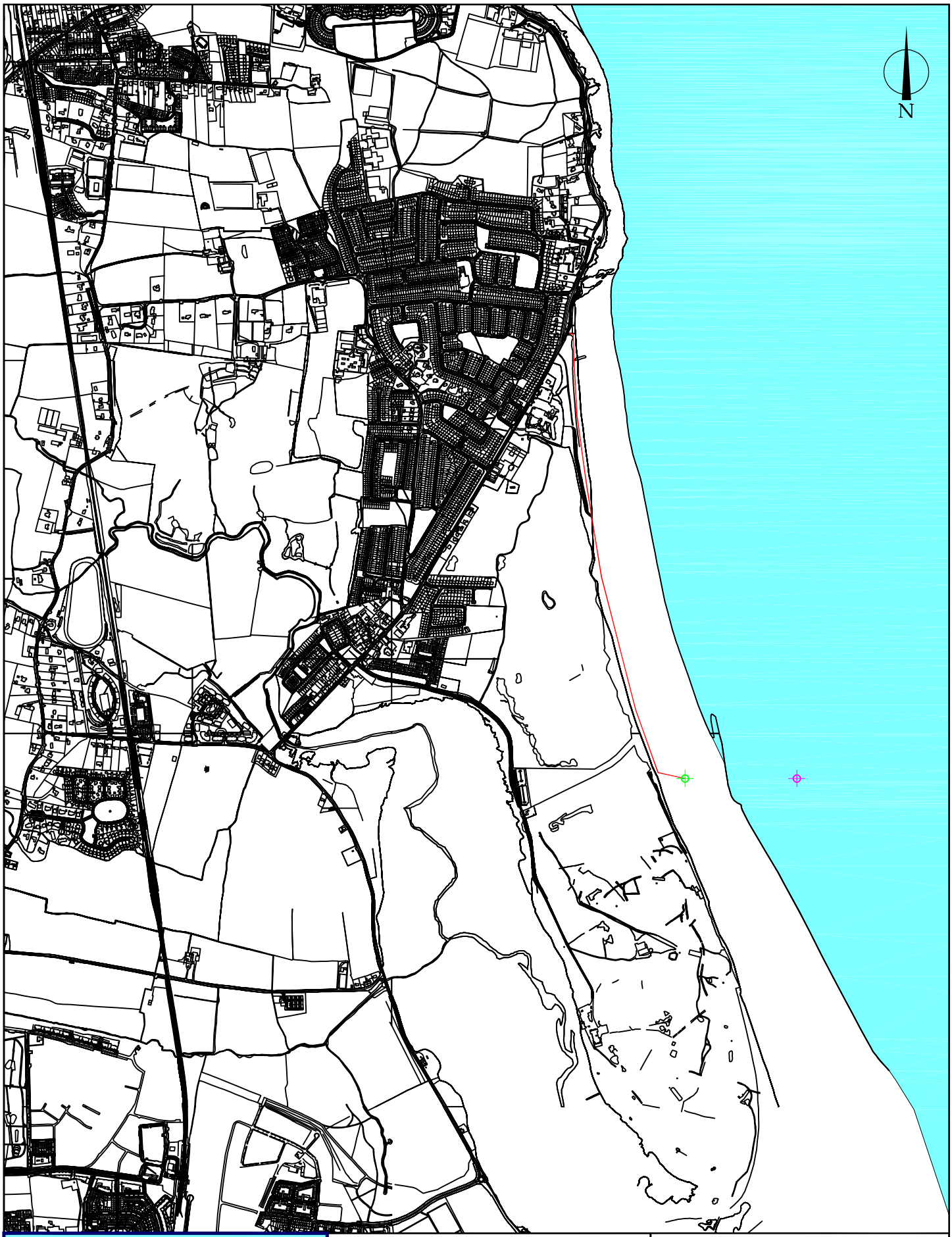
Notes
Source: OSi Discovery Series Mapping
Intertidal Survey Area

Title
Figure 1- Extract from OS mapping showing location of ADCO Intertidal Survey Area.

A4

Client	Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
IAC Ltd./ Irish Water	Greater Dublin Drainage Project, Velvet Strand	15D0019	R.Bangerter	GDD_Velvet	21.04.15	1:50,000	Figure 1



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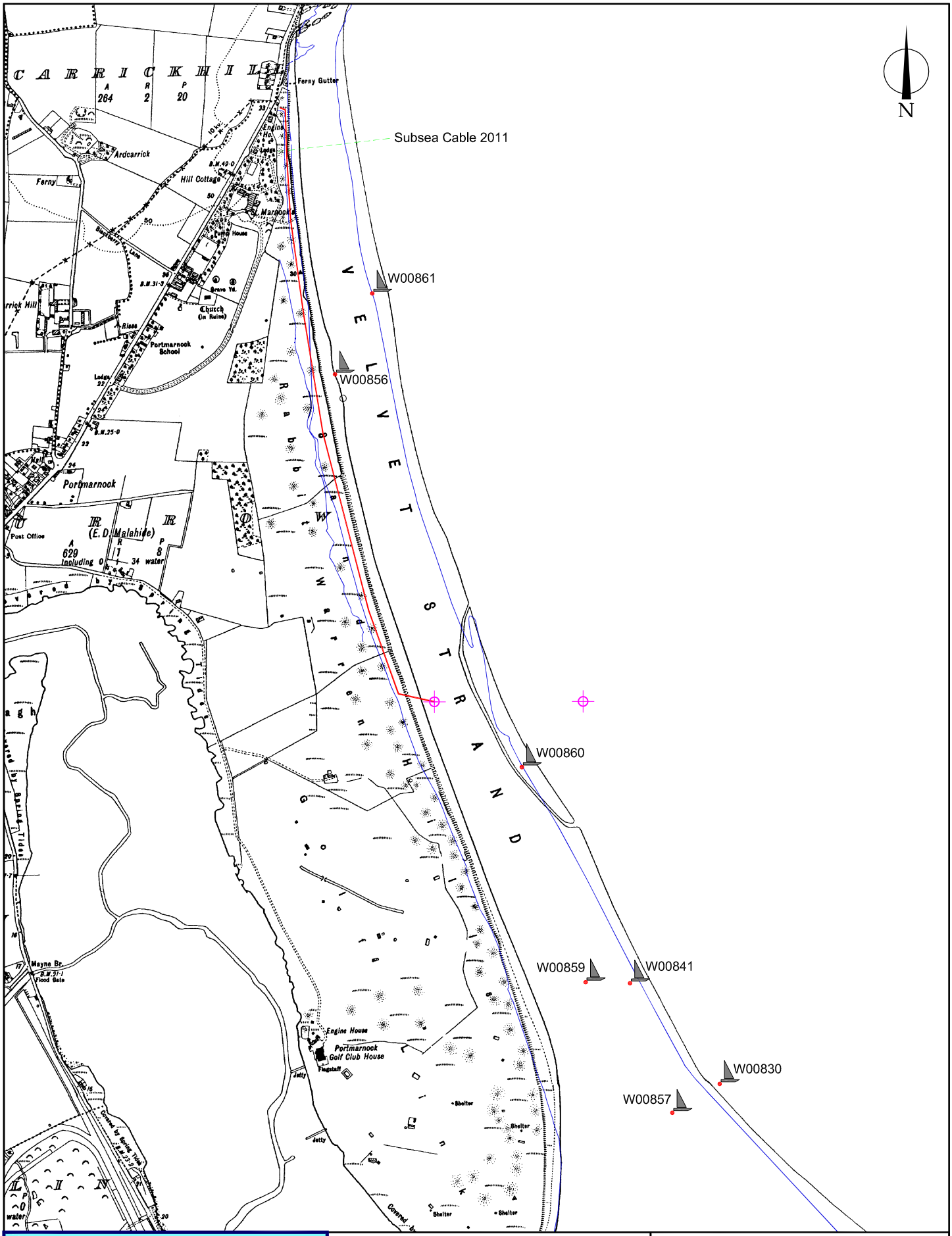
Notes
Source: Figure adapted from information provided by IAC Ltd.
Proposed Haul Road
Bore Hole Location
Vibro Core Location

Title
Figure 2- Project Drawing showing location of proposed Haul Road and geo-technical testing sites.

A4

Client	Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
IAC Ltd./ Irish Water	Greater Dublin Drainage Project, Velvet Strand	15D0019	R.Bangerter	GDD_Velvet	21.04.15	1:20,000	Figure 2



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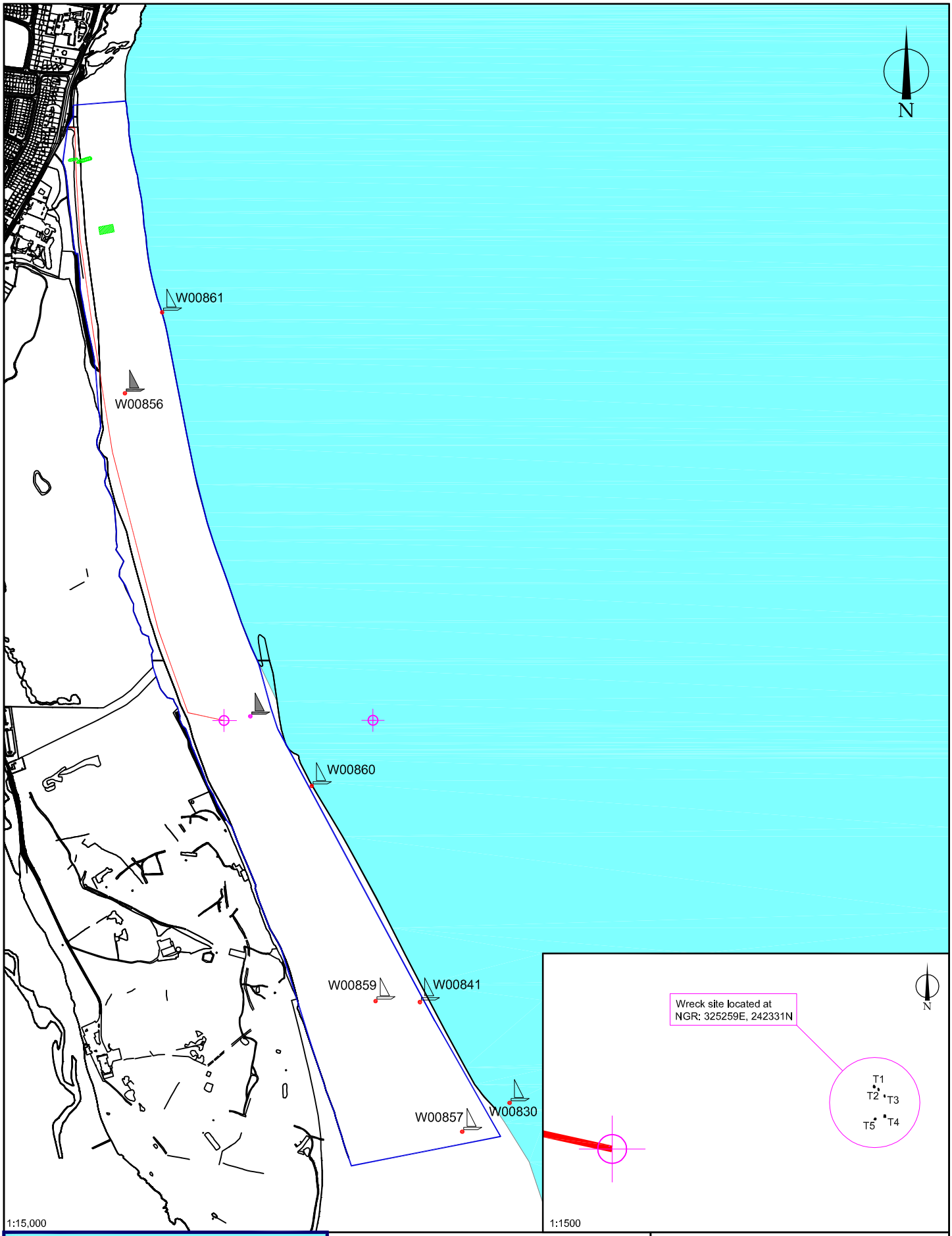
Client
IAC Ltd./ Irish Water

Notes
Source: OSi Historic Map Archive
Proposed Haul Road
Subsea Cable Landfall
Present day coastline
Geological Testing Sites
Known Shipwreck Site

A4

Title
Figure 3- Extract from OS (1912) 25" mapping with location of proposed development, limit of present day coastline, and known shipwreck sites superimposed.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Greater Dublin Drainage Project, Velvet Strand	15D0019	R.Bangerter	GDD_Velvet	21.04.15	1:15,000	Figure 3



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Client
IAC Ltd./ Irish Water

Notes
Intertidal Survey undertaken on 10th April 2015.
Proposed Haul Road
Geological Testing Sites
ADCO Survey Area
Bedrock Outcrops
Newly observed Shipwreck Site
Known Shipwreck Site
A4

Title
Figure 4- Project Drawing showings location and extent of ADCO Survey Area and survey observations.
[Thumbnail: location and position of five framing timbers from a shipwreck buried within the beach deposits on Velvet Strand].

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Greater Dublin Drainage Project, Velvet Strand	15D0019	R.Bangerter	GDD_Velvet	21.04.15	1:15,000/ 1:1500	Figure 4

Plate 1: View looking South across intertidal foreshore on Velvet Strand.

Plate 2: View looking North across intertidal foreshore on Velvet Strand.

Plate 3: View looking North at foot of sand dunes, at a point where the access route will turn eastwards across the beach. The dark grey boulders reflect the line of rock-armour protection inserted to prevent coastal retreat.

Plate 4: View looking North across intertidal foreshore, showing the gentle modulation of the sands, and presence of some intertidal stream channel on the seaward side.

Plate 5: View looking East across a rock outcrop that appears to be cut into, perhaps for a subsea cable laid in 2011. The bright patch in the centre-bottom of the image is a concrete spread.

Plate 6: View looking South across three exposures of rock outcrop.

Plate 7: View looking Southeast across low bedrock exposure, some 1.4km south of the development area.

Plate 8: View of current sand surface at the location of known wrecksite W00856, showing no indication of the wreck today.

Plate 9: View looking West from the location of W00856, showing the nature of the beach area inland.

Plate 10: View looking East from the location of W00856, showing the nature of the beach seaward.

Plate 11: View looking North across the exposed tips of the framing timbers representing the location of a new wrecksite, 80m east of Borehole 1.

Plate 12: View looking South across the exposed tips of the framing timbers representing the location of a new wrecksite, 80m east of Borehole 1.

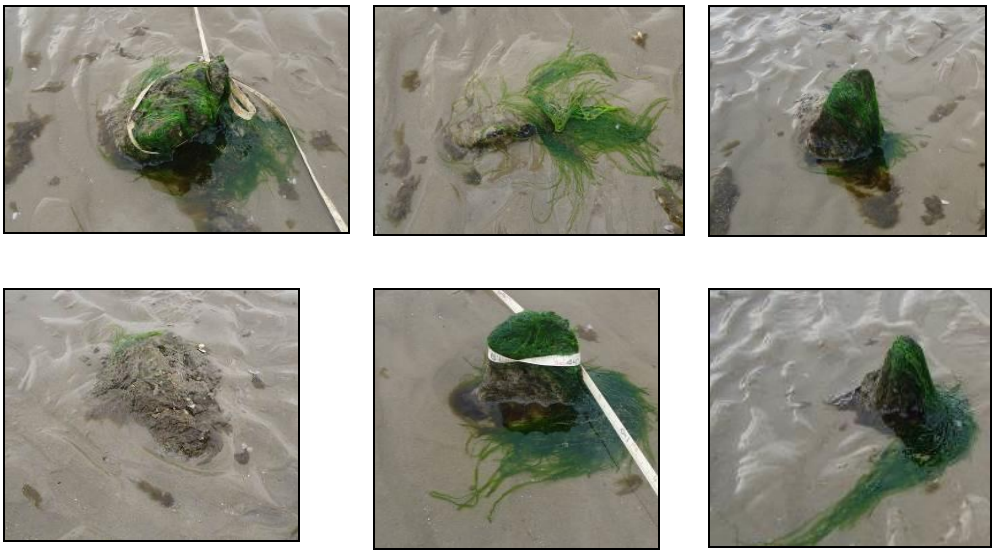
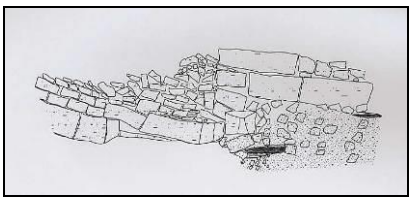


Plate 13: Close-up view of the six framing timbers that identify the new wrecksite, 80m east of Borehole 1. Clockwise from top follows the timbers from N to S, with the SW timber on the lower left.

Plate 14: View looking North along the shoreline at the foot of the dunes, where it is proposed to run the access route.

Recording prehistoric logboat at Gormanston, Co. Meath
GAS 2025 Irish Sea Interconnector

Underwater elevation of bridge pier collapsed in 1763. River Nore Flood Alleviation Scheme



Iron cannon on site of 17th-century timber wreck discovered during dredging programme
Waterford Harbour